

REMARKS

Claims 1-19 are pending in this application. Claims 1-19 have been rejected under 35 U.S.C. §103(a).

Rejection of Claims 1-19

Claims 1-19 are rejected under 35 U.S.C. §103(a) as being unpatentable over *O'Beck et al.* (U.S. 6,794,471). In connection with the rejection of independent claim 1, the Examiner states:

Applicant claimed invention relates to a process to remove N-contaminants from a syngas stream comprising the steps of:

- (a) introducing a syngas stream and a water stream into a first absorber;*
- (b) recovering a first-washed syngas stream overhead from the first absorber;*
- (c) introducing the first-washed syngas stream and a Fischer-Tropsch produced water stream into a second absorber; and*
- (d) recovering a second-washed syngas stream overhead from the second absorber.*

O'Beck teaches that the synthesis gas exiting from autothermal reformer 62 will often contain various contaminants such as ammonia, hydrogen cyanide, other nitrogen based compounds and various contaminants associated with the natural gas stream. These contaminants may be harmful with respect to the Fischer-Tropsch catalyst (not expressly shown) contained within Fischer-Tropsch reactor 90 (see col. 7, lines 30-36).

O'Beck teaches that synthesis gas water wash column 70 and water stripping column 100 cooperate with each other to assist in removing a substantial quantity of undesired contaminants contained in the synthesis gas exiting from autothermal reformer 60. Synthesis gas water wash column 70 and water stripping column 100 also cooperate with each other to assist in removing a substantial quantity of undesirable contaminants which may be contained within water produced by the associated Fischer-Tropsch's process. Synthesis gas water wash column 70 may be generally described as a "packed column." Conduit 62 preferably directs synthesis gas from autothermal reformer 60 to enter at or near the bottom of synthesis gas water wash column 70. Water from conduit 72 preferably enters at or near the top of synthesis gas water wash column 70 and is sprayed over the packing (not expressly shown) contained therein. The general fluid flow paths within synthesis gas water

wash column 70 may be described as an upward flow of synthesis gas and a counter current or downward flow of sprayed water. The counter current flow in cooperation with the packing results in the water removing or scrubbing contaminants such as ammonia, hydrogen cyanide, various nitrogen based compounds and other contaminants from the synthesis gas (see col. 7, lines 45-67).

O'Beck teaches that Water produced by the Fischer-Tropsch process is preferably separated from other Fischer-Tropsch products and directed to the synthesis gas water wash column to remove undesired contaminants from synthesis gas prior to entering the Fischer-Tropsch reactor. Contaminated water from the synthesis gas water wash column is preferably directed to the water stripping column. Suitable fluids such as steam and/or tail gas are preferably supplied to the water stripping column for use in removing gases, soluble compounds, and other undesired contaminants from the contaminated water. A stream of contaminated steam is preferably directed from the water stripping column to a combustion chamber of at least one of the gas turbines. The stripped water is preferably directed to a disposal facility and/or may be recycled for use in the synthesis gas water wash column (see col. 2, lines 50-67). The synthesis gas is generated in the presence of oxygen, and then synthesis gas is reacted in the presence of a cobalt supported by silica, alumina or silica alumina materials to produce Fischer-Tropsch products (see col. 2, lines 9-11 and col. 8, lines 34-45).

The difference between O'Beck and the claimed invention is that the instant claims require introducing the first washed syngas stream and a Fischer-Tropsch produced water stream into a second absorber. However, O'Beck recognizes that nitrogen containing compounds are harmful with respect to the Fischer-Tropsch catalyst contained within Fischer-Tropsch reactor (see col. 7, lines 30-36). Therefore, synthesis gas water wash column 70 and water stripping column 100 cooperate with each other to assist in removing a substantial quantity of undesired contaminants contained in the synthesis gas exiting from autothermal reformer 60. It would therefore would have been obvious to one of ordinary skill in the art at the time the invention was made to further remove the nitrogen containing compounds from synthesis gas by running it through a second absorber in order to obtain a synthesis gas free of contaminants, which does not deactivate the Fischer-Tropsch synthesis catalyst.

Response to Rejection of Claims 1-19Applicable Law

To establish a *prima facie* case of obviousness under 35 U.S.C. § 103, an Examiner must meet three criteria. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Furthermore, the motivation to modify or combine the teachings of the prior art must be identified in making and sustaining an obviousness rejection. *See In re Rouffet*, 149 F.3d 1350, 47 U.S.P.Q.2d 1453 (Fed. Cir. 1998) (reversing an obviousness rejection for lack of identification by the Examiner and the Board of motivation to combine prior art references). The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). *See also In re Fritch*, 972 F.2d 1260, 23 USPQ2d 1780 (Fed. Cir. 1992). And while it is recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning, reliance on knowledge gleaned only from the Applicant's disclosure, such a reconstruction is proper. *See In re McLaughlin*, 443 F.2d 1392, 170 USPQ2d 209 (CCPA 1971). Drawing on hindsight knowledge of claimed invention, when the prior art does not contain or suggest that knowledge, is to use the invention as a template for its own reconstruction – an illogical and inappropriate process by which to determine patentability. *Sensonic, Inc. v. Aerosonic, Corp.*, 38 USPQ2d 1551 (Fed. Cir. 1996). Thus, where there is no motivation to modify a reference, the rejection has been based on impermissible hindsight and the rejection is improper.

The second criteria in establishing a *prima facie* case of obviousness requires that there be a reasonable expectation of success. *See generally*, M.P.E.P. §2143 and the cases cited therein. Finally, the prior art must teach or suggest all the claim limitations of the rejected claim(s). *Id.* In the absence of a proper *prima facie* case of obviousness, an applicant who complies with the other statutory requirements is entitled to a patent. *See In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992).

Applicant respectfully traverses the rejection of claim 1. The Examiner correctly notes that the *O'Beck* reference does not teach introduction of the first washed syngas stream and a Fischer-Tropsch produced water stream into a second absorber. The Examiner currently notes that *O'Beck* teaches the use of a scrubber-stripper combination. The water feed to the top of the single scrubber

(72) of *O'Beck* is a mixture of ATR condensed water, FTR water, and internal circulation water. The water taken from the bottom of the scrubber of *O'Beck* contains nitrogen compounds from the ATR condensing stream, absorbed nitrogen compounds from washing the syngas, and an equilibrium amount of nitrogen compounds in the circulation loop. The relative amount of nitrogen containing compounds contained in these streams is 100:1:2. Thus, it would be quite disadvantageous to mix these streams with a relatively clean Fischer-Tropsch water which contains no or little nitrogen-containing compounds.

The equilibrium conditions at the top of the scrubber (top of the back bed) in the *O'Beck* disclosure put a restriction to the minimum level of nitrogen containing compounds. First the minimum level of nitrogen containing compounds in the clean syngas (stream 74 from *O'Beck*) must be in equilibrium with stream 72, which is a mixture of a clean stream (FT water 158), the stripped stream 114 and the contaminated water stream 79. This is in contrast with the present invention which does not mix these water streams.

According to the present invention, the raw syngas stream 21 is first washed with the stripped water stream 23. This removes more than 90% of the nitrogen containing compounds, leaving the rest to be removed in the second scrubber. The task of removing nitrogen containing compounds from a less concentrated stream requires a cleaner stream, in this case FT water (stream 27). The practice of two scrubber forces the clean syngas (stream 28) to be in equilibrium with the FT water (stream 27) which is almost free from nitrogen compounds. This ensures a lower level of nitrogen containing compounds than achieved by *O'Beck*.

The use of the claimed invention would be obvious to one of ordinary skill in the art since it involves a larger capital investment (two scrubbers rather than one) and the reduction of the concentration of contaminants in the cleaned syngas stream based on equilibrium concentrations at the top of the final scrubber.

Based upon the arguments presented above, Applicant respectfully asserts that claim 1 is in condition for allowance. Because claim 1 is not rendered obvious by the cited references, Applicant respectfully asserts that the claims depending directly or indirectly from claim 1 are also not obvious in light of the cited references. Thus, Applicant respectfully requests withdrawal of the rejection of claims 1-19 under 35 U.S.C. § 103.

CONCLUSION

In view of the foregoing, Applicants respectfully assert that the claims, as amended, are in condition for allowance. Consequently, Applicants request the Examiner withdraw all rejections and allow all pending claims.

The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment, to Deposit Account No. 50-3420, reference 31176234.030001 (VKF).

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